

**ANNEX
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER
AND
THE UNIVERSITY OF WASHINGTON
UNDER SPACE ACT UMBRELLA AGREEMENT NUMBER 30729, SAA2-403496
(ANNEX NUMBER ONE)**

ARTICLE 1. PURPOSE

This Annex shall be for the purpose of facilitating the development of a substantial modification to an existing NASA technology – called the “carbon nanotube sensor” – to enable its use underwater to detect Nitrous Oxide (N₂O) and Nitric Oxide (NO).

UW and NASA ARC submitted a joint proposal to the National Science Foundation (NSF) for work that, in part, requires the use of a carbon nanotube sensor that has been modified for 1) underwater applications and 2) detection of N₂O and NO. NSF selected that proposal for funding and directed its grant dollars solely to UW. This Annex, therefore, enables the transfer of funding from UW to NASA ARC, to reimburse NASA ARC for its expertise in modifying the carbon nanotube sensor to meet the specifications set forth in the selected proposal. NASA ARC will also assist in performing lab and field testing.

The legal authority for this Annex, consistent with the Umbrella Agreement, is the National Aeronautics and Space Act (51 U.S.C. § 20113(e)).

ARTICLE 2. RESPONSIBILITIES

A. NASA ARC will use reasonable efforts to:

1. Advise Partner on the selection of the materials for carbon nanotube sensors to identify NO and N₂O at 100ppb and 5ppb against ocean background gases, respectively, to meet partner's requirements.
2. Advise Partner on the carbon nanotube sensors' selectivity to potential interferences such as water, methane, hydrogen sulfide, and carbon monoxide.
3. Discuss interface requirements with the Partner, and summarize findings.
4. Assist the Partner with integration and field testing of the system.
5. Assist the Partner with data analysis of the carbon nanotube sensors.

B. Partner will use reasonable efforts to:

1. Provide environmental chamber for sensor chip testing, and electronics development.
2. With advice from NASA ARC personnel, develop and integrate a carbon nanotube sensor to Partner specifications, and evaluate the sensor's performance.

3. Comply with all applicable NASA safety requirements for work in NASA facilities and during field testing.

ARTICLE 3. SCHEDULE AND MILESTONES

The planned major milestones for the activities for this Annex defined in the "Responsibilities" Article are as follows:

Milestone	Estimated Completion Date
Discuss design characteristics of modified sensor, such as interface requirements and selectivity to potential interferences (Joint)	Execution of Annex One + 3 months
Select materials required to modify carbon nanotube sensor for N2O and NO detection underwater (Joint)	Execution of Annex One + 9 months
Provide access to environmental chamber (UW)	Execution of Annex One + 12 months
Develop and integrate the modified carbon nanotube sensor with advice from NASA ARC (Joint)	Execution of Annex One + 24 months
Perform lab and field testing of the system (Joint)	Execution of Annex One + 30 months
Perform data analysis and discuss findings (Joint)	Execution of Annex One + 36 months

ARTICLE 4. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of \$70,000 for NASA to carry out its responsibilities under this Annex. Each payment shall be marked with ARC SAA2-403496-1.

B. NASA will not provide services or incur costs beyond the current funding. Although NASA has made a good faith effort to accurately estimate its costs, it is understood that NASA provides no assurance that the proposed effort under this Annex will be accomplished for the estimated amount. Should the effort cost more than the estimate, Partner will be advised by NASA as soon as possible. Partner shall pay all costs incurred and have the option of canceling the remaining effort, or providing additional funding in order to continue the proposed effort under the revised estimate. Should this Annex be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA shall account for any unspent funds within [insert timeframe, cannot exceed one year] after completion of all effort under this Annex, and promptly thereafter, at Partner's option return any unspent funds to Partner or apply any such unspent funds to other activities under the Umbrella Agreement.

ARTICLE 5. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

A. Data produced under this Annex which is subject to paragraph C. of the Intellectual Property

Rights - Data Rights Article of the Umbrella Agreement will be protected for the period of one year.

B. Under paragraph H. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement, Disclosing Party provides the following Data to Receiving Party. The lists below may not be comprehensive, are subject to change, and do not supersede any restrictive notice on the Data provided.

1. Background Data:

None.

2. Third Party Proprietary Data:

None.

3. Controlled Government Data:

None.

4. The following software and related Data will be provided to Partner under a separate Software Usage Agreement:

None.

ARTICLE 6. TERM OF ANNEX

This Annex becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect until the completion of all obligations of both Parties hereto, or three years from the Effective Date, whichever comes first, unless such term exceeds the duration of the Umbrella Agreement. The term of this Annex shall not exceed the term of the Umbrella Agreement. The Annex automatically expires upon the expiration of the Umbrella Agreement.

ARTICLE 7. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Annex by providing thirty (30) calendar days written notice to the other Party.

ARTICLE 8. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Annex.

Management Points of Contact

NASA Ames Research Center

Mike O'Neil

Agreement Manager

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Technical Points of Contact

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ARTICLE 9. MODIFICATIONS

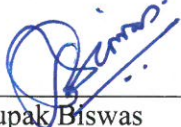
Any modification to this Annex shall be executed, in writing, and signed by an authorized representative of NASA and the Partner. Modification of an Annex does not modify the terms of the Umbrella Agreement.

ARTICLE 10. SIGNATORY AUTHORITY

The signatories to this Annex covenant and warrant that they have authority to execute this Annex. By signing below, the undersigned agrees to the above terms and conditions.

**NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION
AMES RESEARCH CENTER**

UNIVERSITY OF WASHINGTON

BY: 
Dr. Rupak Biswas
Director of Exploration Technology

DATE: 8/27/2019

BY: 
Name: Kassy Ellefson
Title: Sr. Contract Manager

DATE: 13 August 2019